

Appl. No.: 10/538,828
Amdt. dated June 18, 2007
Reply to Office Action of January 18, 2007

REMARKS/ARGUMENTS

Reconsideration and allowance of the above identified application is respectfully requested in light of the above amendments and the following remarks.

The Present Invention

To briefly summarize, the claimed invention relates to a longwall support control for controlling the movements of longwall support units 1-18 in the longwall of a mine. In prior art longwall support control systems, a failure in a mining shield control device makes the entire system inoperative. However, the present invention advantageously permits operating the system despite such failure.

The invention as defined in the claims of the application comprises a plurality of longwall support units 1-18, a central control system 50, 51, and a plurality of mining shield control devices 34 connected to the support units and connected to the control system via at least one bus line 58.

Each mining shield control device 34 stores a unique code word and is programmed to be activated to carry out the respective shield functions only when the stored code word is received from the bus line.

As important features of the present invention, each mining shield control device comprises a multichannel radio transceiver, which permits a permanent and simultaneous back and forth (transmit and receive) contact of the mining shield control devices with a decentralized, portable operating device for simultaneously receiving control signals, and transmitting

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data of measurement.

The Claim Rejections Under §102(b)

In the Official Action, the Examiner rejected Claims 1, 2, 3, and 5 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 4,146,271 to Ward et al. (the Ward et al. reference) or U.S. Patent No. 5,029,943 to Merriman (the Merriman reference).

Ward shows a mine roof support system with a remote control 22 and a plurality of unit control means 20, each associated to one of the roof support units. A multicore cable 23, consisting of a plurality of individual cores 25 connects via cable sockets 26, 27 on each unit the control means 20 of neighboring roof support units and with the remote control 22.

Ward furthermore indicates (see Claim 1), that the units at each of the supports have means for receiving function initiating signals as well as means for transmitting data. Ward shows external input modules 112 and internal input modules 113, with the term internal inputs intended to mean lines feeding in presets at the central control console itself (col. 9, lines 26-30). Internal input module 113 is shown with input lines 130 from various control console input means such as push buttons, thumbwheels and switches (col. 10, lines 1-3).

Column 10 of Ward refers to various inputs and the respective input lines 131, 132, 133, 138, 139, 140, 141, 142. However, these lines do not comprise a multichannel radio transceiver and a radio link to a portable control device as presently claimed. Nor is there any suggestion that control signals are only converted to functions of the long wall

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support, when the control signal is associated with a code word, which in turn is associated to the called up shield control device, as presently claimed.

Merriman relates to a mining machine 11 traveling along a series of roof supports 16. Information gathered on the mining machine is transmitted by a transmitter 30 of the machine to a receiver 32 on each of the roof supports 16, connected to the control box 27 on each roof support. The control boxes are electrically connected to each other so that events on one support can be used to control an adjacent support (col. 3, lines 65-68).

As shown in Fig. 3, the control boxes 27 are connected to each other by one cable. Data received by one control box 27 is then passed along existing links to the face end control unit 28 (col. 4, lines 21-22).

Merriman is silent with respect to those links. What can be determined is, that those links are constituted by cables between two neighboring control boxes 27. The cable stretches from the exit of one of the control boxes 27 to the entrance of the next one and then to the face end control unit 28. Those cables are adapted to transfer measurement information collected on and by the mining machine from the mining machine via transmitter 30 and the nearest receiver 32 by infrared ray to one of the control boxes 27.

There is no radio transceiver on each of the control boxes for receiving control signals and simultaneously returning data of measurement and state, as recited in present Claim 1.

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The Claim Rejection Under §103

Claims 1, 2, 3, and 5 were also rejected as being unpatentable over Kussel '802, Kussel '842, British document '652 and German document '698 in view of Hubner '342.

Hubner discloses a system for monitoring values of a gas analyzing measurement. Measuring device 2 is transported by an operator along a tortuous mine tunnel 4. Along the tunnel, the fixed stations 5, 6 are disposed in spaced relationship (col. 5, lines 74-75). The radio signals generated by the information transmitter 1, 21 on the backpack of moving operator are transmitted to the next one of the fixed stations 5, 6, i.e. receiver 5 thereof. From each of the fixed stations 5, 6 the received signal is transmitted to other stations as represented at 44 by wire (col. 5, lines 15-18, Fig. 3) and eventually communicated to the central station 45 via transmission line 46. The wire at 44 may be replaced by radio contact, see antenna 52 in Fig 3 and Fig. 2 and col. 5, lines 45-46.

Hubner is thus seen to teach a plurality of stationary control units (fixed stations 5, 6), which are interconnected with each other by wire and from the last one to a central control unit. The contact between the portable measuring device 2 and the nearest one of the stationary control units is made wireless by radio transmitter/receiver including a signal indicating receipt of the measuring signal.

However Hubner does not disclose that the stationary control units (fixed stations 5, 6), or the central control unit or the portable measuring device serve for generating any kind of control. Therefor the receiving signal of Hubner is different from the function of transmitting of data of

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measurement and state as set forth in the present application. The receiving signal of Hubner needs to be transmitted after the signal of measurement has been received and therefore the same channel may be used for both signals. Otherwise a double antenna would be shown in Fig. 3 of Hubner.

Moreover Hubner does not disclose an identifier and it can not be seen, why and for what purpose such identification would serve, since the portable measuring device always addresses the nearest one of fixed stations 5, 6 without any further identification while the measuring signals are fed through the other fixed stations 5, 6 to the central station without any address to another of the fixed stations 5, 6.

Thus, whatever is lacking the other prior art cited under the §103 rejection cannot be derived from the teach of Hubner.

The cited document GB Patent 2 265 652 has a back and forth communication system between a portable data unit 12/32 to a central computer 13/30, in Fig. 1 by radio and in Fig. 3 by infrared. In Fig 3, the signals are fed through the control units 31, which are connected to the control computer 30 by wires (page 5, lines 17-20). However, the other features of the present invention as summarized above are not taught or suggested.

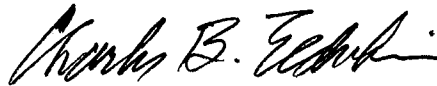
The dependent claims 3, 5, and 6 relate to other novel and distinguishing features of the present invention. For example, Claim 3 recites the presence of a second parallel bus line 59, and Claim 5 recites the presence of an amplifier 54 in each mining shield control device 34 for amplifying the signals that are received from the bus line. New Claim 6 adds the switching element 53 which is present in each mining shield control

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device. None of these features are seen to be taught or suggested by the cited prior art in the context of the present invention.

In summary, it is respectfully submitted that all of the pending claims are in condition for immediate allowance, and such action is solicited.

Respectfully submitted,



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